What is claimed is:

1. A system for sensing one or more motor currents from a three phase inverter, comprising:

a first sense resistor coupled between a first switch of a first leg of a three phase inverter and a supply voltage and adapted to sense a first motor current when the first switch is active;

a second sense resistor coupled between a second switch of the first leg of the three phase converter and ground and adapted to sense the first motor current when the second switch is active; and

a first circuitry adapted to:

generate an upper current that is proportional to the difference of a first reference voltage and a voltage across the first sense resistor when the first switch is active, and proportional to the first reference voltage when the first switch is inactive;

generate a lower current that is proportional to the sum of a second reference voltage and a voltage across the second sense resistor when the second switch is active, and proportional to the second reference voltage when the second switch is inactive, wherein the second reference voltage is essentially the same as the first reference voltage; and

provide a first output current that is essentially the difference of the lower current and the upper current, thereby providing a first continuous output current that is proportional to the first motor current provided by the three phase inverter.

2. The system of claim 1 wherein the first and second switches of the three phase converter are alternately activated.

3. The system of claim 1 further comprising a bias supply circuit adapted to provide the first and second reference voltages.

4. The system of claim 3 wherein the bias supply circuit is further adapted to provide the first and second reference voltages based on a single voltage source.

5. The system of claim 1 further comprising an analog-to-digital (A/D) tracking converter adapted to digitize the first output signal.

6. The system of claim 5 wherein the A/D tracking converter is a delta sigma converter.

7. The system of claim 1 wherein the first circuitry comprises:
an upper current source comprising:
an upper resistor having first and second terminals, the first terminal coupled to the first sense resistor; and
an upper voltage follower coupled to the second terminal of the upper resistor and adapted to generate a fixed voltage relative to the supply voltage at a first node connecting the upper voltage follower and the upper resistor.

8. The system of claim 7 wherein the first circuitry further comprises:
a lower current source comprising:
a lower resistor having first and second terminals, the first terminal coupled to the second sense resistor; and
a lower voltage follower coupled to the second terminal of the lower resistor and adapted to generate the reference voltage at a second node connecting the lower voltage follower and the lower resistor,
wherein the output current is generated at a third node connecting the upper current source and the lower current source.

9. The system of claim 8 further comprising filtering circuitry adapted to filter high amplitude noise spikes across the first and second sense resistors.

10. The system of claim 9 further comprising second filtering circuitry adapted to protect the upper and lower current sources from high frequency tones.

11. The system of claim 1 wherein the system further comprises:

a third sense resistor coupled between a first switch of a second leg of the three phase inverter and the supply voltage and adapted to sense a second motor current when the first switch of the second leg is active ;

a fourth sense resistor coupled between a second switch of the second leg of the three phase converter and ground and adapted to sense the second motor current when the second switch of the second leg is active; and

second circuitry adapted to:

generate an second upper current that is proportional to the difference of a third reference voltage and a voltage across the third sense resistor when the first switch of the second leg is active, and proportional to the third reference voltage when the first switch of the second leg is inactive;

generate a second lower current that is proportional to the sum of a fourth reference voltage and a voltage across the fourth sense resistor when the second switch of the second leg is active, and proportional to the fourth reference voltage when the second switch of the second leg is inactive, wherein the third and fourth reference voltages are essentially the same as the first and second reference voltages; and

provide a second output current that is essentially the difference of the second lower current and the second upper current, thereby providing a second continuous output current that is proportional to the second motor current provided by the three phase inverter.

12. The system of claim 11 wherein the first, second, third, and fourth reference voltages are based on a single voltage source.

13. The system of claim 11 wherein the first and second switches of the second leg of the three phase converter are alternately activated.

14. The system of claim 11 further comprising a first analog-to-digital (A/D) tracking converter adapted to digitize the first output signal and a second A/D tracking converter adapted to digitize the second output signal.

15. The system of claim 14 wherein the first and second A/D tracking converters are delta sigma converters.

16. The system of claim 11 wherein the first circuitry comprises:
a first upper current source comprising:
a first upper resistor having first and second terminals, the first terminal coupled to the first sense resistor; and
a first upper voltage follower coupled to the second terminal of the first upper resistor and adapted to generate a fixed voltage relative to the supply voltage at a first node connecting the first upper voltage follower and the first upper resistor.

17. The system of claim 16 wherein the first circuitry further comprises:
a first lower current source comprising:
a first lower resistor having first and second terminals, the first terminal coupled to the second sense resistor; and
a first lower voltage follower coupled to the second terminal of the first lower resistor and adapted to generate the reference voltage at a second node connecting the first lower voltage follower and the first lower resistor,
wherein the first output current is generated at a third node connecting the first upper current source and the first lower current source.

18. The system of claim 17 wherein the second circuitry comprises:
a second upper current source comprising:
a second upper resistor having first and second terminals, the first terminal coupled to the third sense resistor; and
a second upper voltage follower coupled to the second terminal of the second upper resistor and adapted to generate a fixed voltage

relative to the supply voltage at a fourth node connecting the second upper voltage follower and the second upper resistor.

19. The system of claim 18 wherein the first circuitry further comprises:

a second lower current source comprising:

a second lower resistor having first and second terminals, the first terminal coupled to the fourth sense resistor; and

a second lower voltage follower coupled to the second terminal of the second lower resistor and adapted to generate the reference voltage at a fifth node connecting the second lower voltage follower and the second lower resistor,

wherein the second output current is generated at a sixth node connecting the second upper current source and the second lower current source.

20. The system of claim 19 further comprising filtering circuitry adapted to filter high amplitude noise spikes across the first, second, third, and fourth sense resistors.

21. The system of claim 20 further comprising second filtering circuitry adapted to protect the first and second lower current sources and the first and second upper current sources from high frequency tones.

22. A method of sensing one or more motor currents from a three phase inverter, comprising:

providing a first sense resistor between a first switch of a first leg of a three phase inverter and a supply voltage, thereby sensing a first motor current when the first switch is active;

providing a second sense resistor coupled between a second switch of the first leg of the three phase converter and ground, thereby sensing the first motor current when the second switch is active;

generating an upper current that is proportional to the difference of a first reference voltage and a voltage across the first sense resistor when the

first switch is active, and proportional to the first reference voltage when the first switch is inactive;

generating a lower current that is proportional to the sum of a second reference voltage and a voltage across the second sense resistor when the second switch is active, and proportional to the second reference voltage when the second switch is inactive, wherein the second reference voltage is essentially the same as the first reference voltage; and

providing a first output current that is essentially the difference of the lower current and the upper current, thereby providing a first continuous output current that is proportional to the first motor current provided by the three phase inverter.

23. The method of claim 22 wherein the first and second switches of the three phase converter are alternately activated.

24. The method of claim 22 further comprising the step of providing the first and second reference voltages based on a single voltage source.

25. The method of claim 22 further comprising the step of digitizing the first output current, thereby providing a digitized output current.

26. The method of claim 22 further comprising the steps of:

providing a third sense resistor between a first switch of a second leg of the three phase inverter and the supply voltage, thereby sensing a second motor current when the first switch of the second leg is active ;

providing a fourth sense resistor between a second switch of the second leg of the three phase converter and ground, thereby sensing the second motor current when the second switch of the second leg is active;

generating an second upper current that is proportional to the difference of a third reference voltage and a voltage across the third sense resistor when the first switch of the second leg is active, and proportional to the third reference voltage when the first switch of the second leg is inactive;

generating a second lower current that is proportional to the sum of a fourth reference voltage and a voltage across the fourth sense resistor when the second switch of the second leg is active, and proportional to the fourth reference voltage when the second switch of the second leg is inactive, wherein the third and fourth reference voltages are essentially the same as the first and second reference voltages; and

providing a second output current that is essentially the difference of the second lower current and the second upper current, thereby providing a second continuous output current that is proportional to the second motor current provided by the three phase inverter.

27. The method of claim 26 wherein the first, second, third, and fourth reference voltages are based on a single voltage source.

28. The method of claim 26 wherein the first and second switches of the second leg of the three phase converter are alternately activated.

29. The method of claim 26 further comprising the step of digitizing the first output signal and the second output signal.

30. A system for sensing one or more motor currents from a three phase inverter, comprising:

a three phase motor adapted to operate based on a first, second, and third motor current;

a three phase inverter having a first leg adapted to generate the first motor current, a second leg adapted to generate the second motor current, and a third leg adapted to generate the third motor current;

a first sense resistor coupled between a first switch of the first leg of the three phase inverter and a supply voltage and adapted to sense the first motor current when the first switch is active;

a second sense resistor coupled between a second switch of the first leg of the three phase converter and ground and adapted to sense the first motor current when the second switch is active; and

a first circuitry adapted to:

generate an upper current that is proportional to the difference of a first reference voltage and a voltage across the first sense resistor when the first switch is active, and proportional to the first reference voltage when the first switch is inactive;

generate a lower current that is proportional to the sum of a second reference voltage and a voltage across the second sense resistor when the second switch is active, and proportional to the second reference voltage when the second switch is inactive, wherein the second reference voltage is essentially the same as the first reference voltage; and

provide a first output current that is essentially the difference of the lower current and the upper current, thereby providing a first continuous output current that is proportional to the first motor current provided by the three phase inverter.

31. The system of claim 30 wherein the first and second switches of the three phase converter are alternately activated.

32. The system of claim 30 further comprising a bias supply circuit adapted to provide the first and second reference voltages.

33. The system of claim 32 wherein the bias supply circuit is further adapted to provide the first and second reference voltages based on a single voltage source.

34. The system of claim 30 further comprising an analog-to-digital (A/D) tracking converter adapted to digitize the first output signal.

35. The system of claim 34 wherein the A/D tracking converter is a delta sigma converter.

36. The system of claim 30 wherein the first circuitry comprises:

an upper current source comprising:

an upper resistor having first and second terminals, the first terminal coupled to the first sense resistor; and

an upper voltage follower coupled to the second terminal of the upper resistor and adapted to generate a fixed voltage relative to the supply voltage at a first node connecting the upper voltage follower and the upper resistor.

37. The system of claim 36 wherein the first circuitry further comprises:

a lower current source comprising:

a lower resistor having first and second terminals, the first terminal coupled to the second sense resistor; and

a lower voltage follower coupled to the second terminal of the lower resistor and adapted to generate the reference voltage at a second node connecting the lower voltage follower and the lower resistor,

wherein the output current is generated at a third node connecting the upper current source and the lower current source.

38. The system of claim 37 further comprising filtering circuitry adapted to filter high amplitude noise spikes across the first and second sense resistors.

39. The system of claim 38 further comprising second filtering circuitry adapted to protect the upper and lower current sources from high frequency tones.

40. The system of claim 30 wherein the system further comprises:

a third sense resistor coupled between a first switch of the second leg of the three phase inverter and the supply voltage and adapted to sense the second motor current when the first switch of the second leg is active ;

a fourth sense resistor coupled between a second switch of the second leg of the three phase converter and ground and adapted to sense the second motor current when the second switch of the second leg is active; and

second circuitry adapted to:

generate an second upper current that is proportional to the difference of a third reference voltage and a voltage across the third sense resistor when the first switch of the second leg is active, and proportional to the third reference voltage when the first switch of the second leg is inactive;

generate a second lower current that is proportional to the sum of a fourth reference voltage and a voltage across the fourth sense resistor when the second switch of the second leg is active, and proportional to the fourth reference voltage when the second switch of the second leg is inactive, wherein the third and fourth reference voltages are essentially the same as the first and second reference voltages; and

provide a second output current that is essentially the difference of the second lower current and the second upper current, thereby providing a second continuous output current that is proportional to the second motor current provided by the three phase inverter.

41. The system of claim 40 wherein the first, second, third, and fourth reference voltages are based on a single voltage source.

42. The system of claim 40 wherein the first and second switches of the second leg of the three phase converter are alternately activated.

43. The system of claim 40 further comprising a first analog-to-digital (A/D) tracking converter adapted to digitize the first output signal and a second A/D tracking converter adapted to digitize the second output signal.

44. The system of claim 43 wherein the first and second A/D tracking converters are delta sigma converters.

45. The system of claim 40 wherein the first circuitry comprises:

a first upper current source comprising:

a first upper resistor having first and second terminals, the first terminal coupled to the first sense resistor; and

a first upper voltage follower coupled to the second terminal of the first upper resistor and adapted to generate a fixed voltage relative to the supply voltage at a first node connecting the first upper voltage follower and the first upper resistor.

46. The system of claim 45 wherein the first circuitry further comprises:
a first lower current source comprising:

a first lower resistor having first and second terminals, the first terminal coupled to the second sense resistor; and

a first lower voltage follower coupled to the second terminal of the first lower resistor and adapted to generate the reference voltage at a second node connecting the first lower voltage follower and the first lower resistor,

wherein the first output current is generated at a third node connecting the first upper current source and the first lower current source.

47. The system of claim 46 wherein the second circuitry comprises:
a second upper current source comprising:

a second upper resistor having first and second terminals, the first terminal coupled to the third sense resistor; and

a second upper voltage follower coupled to the second terminal of the second upper resistor and adapted to generate a fixed voltage relative to the supply voltage at a fourth node connecting the second upper voltage follower and the second upper resistor.

48. The system of claim 47 wherein the first circuitry further comprises:
a second lower current source comprising:

a second lower resistor having first and second terminals, the first terminal coupled to the fourth sense resistor; and

a second lower voltage follower coupled to the second terminal of the second lower resistor and adapted to generate the reference voltage at a fifth node connecting the second lower voltage follower and the second lower resistor,

wherein the second output current is generated at a sixth node connecting the second upper current source and the second lower current source.

49. The system of claim 48 further comprising filtering circuitry adapted to filter high amplitude noise spikes across the first, second, third, and fourth sense resistors.

50. The system of claim 49 further comprising second filtering circuitry adapted to protect the first and second lower current sources and the first and second upper current sources from high frequency tones.